CHAPTER I
INTRODUCTION

This chapter contains about the background, problem formulation, and objective of the research, research scopes, and outline of the report.

1.1 Background

Agroindustrial as a sub-system of the industrial sector has unique advantages of utilizing the agricultural raw material in agro-product processing. These food processing industries, one of the agro-industrial sectors, are available in West Sumatera. These food processing industries can be seen as important to create employment and generate income, particularly in fruit producer areas.

PT Bina Usaha Keluarga Sedep Roso is one of food processing industries, located in Padang, that produces chili sauce and soy sauce. This company only provides direct purchases to the factory. Chili sauce and soy sauce main ingredients are sweet potatoes and black soybean, respectively. Both chili sauce and soy sauce products have a broad market in West Sumatra. It has a variety of partners such as retailers, wholesalers, and various traders that order to this company. Furthermore, the number of incoming orders to the company is referred to as demand.

Suryaningrat et al (2015) found that common problems in cassava processed industries such as formality of raw material procurement contract with wholesalers or retailers to maintain information about price, number, and quality of the product because of high numbers of raw materials requirement. These indicate that procurement of raw materials is one of the most important components of the supply chain, which facilitates any organization for achieving its goal of increasing the value creation by minimizing the cost. Related to the agro-industrial system, Suryaningrat (2016) cited from Hicks (1991) that some problems associated with

the food industry found are the shortage of raw material, quality, lack of continuous supply of seasonal raw material, inadequately trained labor force, costly imported packing material, infrastructure, and technological deficiencies. Some problem aforementioned is also happening in PT Bina Usaha Keluarga Sedep Roso, particularly in the chili sauce production as shown in Figure 1.1.

Figure 1.1 Chili Sauce Demand and Sales in 2017
(Source: PT Bina Usaha Keluarga Sedep Roso, 2018)

The graph aforementioned shows that the demand of the chili sauce has not fulfilled by the company because of limited raw material. The raw material of the chili sauce consists of sweet potato, chili powder, salt, garlic oil extract, garlic, and other supporting material. According to the survey to the company, there is a problem with the availability of sweet potato as the scarcity of good quality sweet potato outside the harvest season, however, the excess supply of sweet potato in the harvest season occurred. This availability problem shows in table 1.1.

According to table 1.1, there is a problem with the sweet potato availability as the main raw material of the chili sauce. Sweet potato and garlic are perishable, but the garlic needs about 50 kg per month and the supplier capable to fulfill the demand of garlic from the company for full capacity production. Meanwhile, the sweet potato cannot always fulfill by the suppliers to meet the demand of chili sauce. Furthermore, sweet potato purchasing costs contribute to 75% of the total main raw material costs. Therefore, considering the sweet potato purchasing cost component is important because the value of the component has a large influence on the total production cost of chili sauce.

Table 1.1 The Availability of Chili Sauce Main Raw Material

No.	Raw Materials	Estimation of Material Requirements per Month	Note
1	Sweet potato	± 1.000 bags	Perishable, and the suppliers cannot fulfill the demand from the company for several months
2	Chili powder	± 350 kg	Long lasting (not perishable) and the supplier capable to fulfill the demand from the company for full used of production capacity
3	Salt	± 2,4 tons	Long lasting (not perishable) and the supplier capable to fulfill the demand from the company for full used of production capacity
4	Garlic oil	± 15 L	Long lasting (not perishable) and the supplier capable to fulfill the demand from the company for full used of production capacity
5	Garlic	± 50 kg	Perishable, the needs only 50 kg per month, and supplier capable to fulfill the demand from the company for full used of production capacity

(Source: PT Bina Usaha Keluarga Sedep Roso, 2018)

Many agricultural products are perishable, although their shelf-life can be extended through special storage at a cost. Some of the agricultural products are seasonal products and purchased once a year in the harvest season, then are sold until the next harvest season. In this study, we focus on the sweet potato that perishable and seasonal. It makes sweet potato need a different approach to decide the optimal purchase quantity to maximize total cost considering the availability of sweet potato and the capacity of chili sauce production.

The study in East Java, as a center of fruit production in Indonesia, Suryaningrat (2016) identified the determinant factors in fruit processing industries. The required data obtained from 63 selected industries for further analysis such determined the correlation between basic component factors and total performance of fruit processing industries and classified the results of correlation into very strong (more than 0.8), strong (0.61-0.8), medium (0.4-0.6), and weak (less than 0.4). The conclusion shows that continuity and resource of raw material are the factors in raw material procurement that have very strong and strong relationship (r = 0.81 and r = 0.70, respectively) with total performance in fruit industries (shown in Table 1.2). This study illustrates that continuity of raw material is more important than quantity and quality. Reflect on this study, the scarcity problem of sweet potatoes as the

main raw materials provide a bad impact on the total performance and service level of PT Bina Usaha Keluarga Sedep Roso. It means the company should maintain continuity of sweet potato to support processing activities. Therefore, it is necessary to evaluate the current production policy and propose a new production planning to maximize the profit and increase the service level of the company considering the production cost and sweet potato availability.

Table 1.2 Relationship Between Raw material Factors and Total Performance

Raw Material Factors	Relationship with total performance	
	r	Criteria
Resource	0.70*	Strong
Quantity	0.43	Medium
Continuity	0.81**	Very strong
Purchasing power	0.55	Medium
Quality	0.56	Medium
Raw material handling	0.60*	Strong
Storage	0.60*	Strong
Scheduling of raw material	0.71*	Strong
Inventory	0.71*	Strong
Capacity	0.71*	Strong
Organization	0.77*	Strong

(Source: Suryaningrat, 2016)

Due to the perishable nature of the sweet potatoes as raw materials, we can not reserve the raw materials in the storage for a long time, but the finished products of chili sauce can keep for up to 6 months (based on the interview with the owner of the company). To optimize the cost, the company should manage the quantity of chili sauce produce in every period to store as the inventory and sell in the market or retrieve periodically. Based on this situation, turning it from a problem into opportunity maybe can be a good suggestion for the company, propose a new production planning of chili sauce to maximize the profit and increase the service level needed to solve the company's current problem.

1.2 Problem Formulation

Based on the background, the formulation problem in this study is how to manage chili sauce production planning model in order to maximize the profit considering the sweet potato availability in PT Bina Usaha Keluarga Sedep Roso.

1.3 Research Objective

The objective of this study is to propose the chili sauce production planning model at PT Bina Usaha Keluarga Sedep Roso in order to maximize the profit considering sweet potato availability.

1.4 Assumptions

The assumptions in this study are as follows:

1. Inventory cost for sweet potato can be ignored because (in general) the sweet potato are immediately processed after arriving at the factory.
2. Minimal requirement of sweet potato availability is 1600 kg (or enough to fulfilled 2 metal vessel for the steaming process) during a day to decide whether the production run or not on that day.

1.5 Outline of Report

This final project report consists of six chapters as follow:

CHAPTER I INTRODUCTION

This chapter contains background, problem formulation, the research objective, assumptions, and report outline.

CHAPTER II LITERATURE REVIEW

This chapter contains the theories used to solve the research problems consists of inventory, system modeling, linear programming, integer programming, nonlinear programming, and previous research.

CHAPTER III RESEARCH METHODOLOGY

This chapter contains the steps in carrying out the research started from the system characteristic, method selection, model formulation, model verification, application of the model, analysis of results, sensitivity analysis, and conclusions.

CHAPTER IV MATHEMATICAL MODEL

This chapter explains the system characteristic, influence diagram, notations, symbols, and units used in the mathematical model, formulation of the mathematical model, and verification of the mathematical model.

CHAPTER V APPLICATION OF THE MODEL AND ANALYSIS

This chapter contains the application of the model and analysis. Application of the model performed to estimate the practical value of the model. The analysis of results and sensitivity analysis presented in this chapter.

CHAPTER VI CONCLUSIONS

This chapter contains about conclusions of the research and suggestion for further research.


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